

**Punyashlok Ahilyadevi Holkar Solapur University, Solapur**



NAAC Accredited-2022  
'B++' Grade (CGPA 2.96)

**Name of the Faculty: Science & Technology**

**CHOICE BASED CREDIT SYSTEM**

**Syllabus: Botany**

**Name of the Course: B.Sc. I (Sem.– I & II)**

**(Syllabus to be implemented from June 2022)**

**Punyashlok Ahilyadevi Holkar Solapur University, Solapur**  
**Faculty of Science and Technology**  
**Choice Based Credit System (CBCS), (w.e.f.2022-23) Revised Structure for B. Sc-I**

| Subject/ Core Course   | Name and Type of the Paper                   |          | No. of papers/ Practical | Hrs./week |    |           | Total Marks Per Paper | UA          | CA         | Credits   |
|--|--|----------|--------------------------|-----------|----|-----------|-----------------------|-------------|------------|-----------|
|  | Type   | Name     |                          | L         | T  | P         |                       |             |            |           |
| <b>Class: B.Sc.- I Semester – I</b>  |  |          |                          |           |    |           |                       |             |            |           |
| <b>Ability Enhancement Compulsory Course (AECC)</b>  | English Paper I Part-A (communication skill) |          |                          | 4.0       |    |           | 50                    | 40          | 10         | 2.0       |
| <b>Core Courses</b><br>(*Students can opt any Four Subjects from the Twelve Subjects Listed below. | DSC 1A                                       |          | Paper- I                 | 2.5       | -- | --        | 50                    | 40          | 10         | 4.0       |
|  |  |          | Paper-II                 | 2.5       | -- | --        | 50                    | 40          | 10         |           |
|  | DSC 2A                                       |          | Paper-I                  | 2.5       | -- | --        | 50                    | 40          | 10         | 4.0       |
|  |  |          | Paper-II                 | 2.5       | -- | --        | 50                    | 40          | 10         |           |
|  | DSC 3A                                       |          | Paper-I                  | 2.5       | -- | --        | 50                    | 40          | 10         | 4.0       |
|  |  |          | Paper-II                 | 2.5       | -- | --        | 50                    | 40          | 10         |           |
|  | DSC 4A                                       |          | Paper-I                  | 2.5       | -- | --        | 50                    | 40          | 10         | 4.0       |
|  |  | Paper-II | 2.5                      | --        | -- | 50        | 40                    | 10          |            |           |
| <b>Total</b>   |  |          |                          | <b>24</b> | -- | --        | <b>450</b>            | <b>360</b>  | <b>90</b>  | <b>18</b> |
| <b>Class: B.Sc.- I Semester – II</b>   |  |          |                          |           |    |           |                       |             |            |           |
| <b>Ability Enhancement Course (AECC)</b>   | English Paper I Part-B (communication skill) |          |                          | 4.0       |    |           | 50                    | 40          | 10         | 2.0       |
| <b>Core Courses</b><br>(*Students can opt any Four Subjects from the Twelve Subjects Listed below. | DSC 1B                                       |          | Paper-III                | 2.5       | -- | --        | 50                    | 40          | 10         | 4.0       |
|  |  |          | Paper-IV                 | 2.5       | -- | --        | 50                    | 40          | 10         |           |
|  | DSC 2B                                       |          | Paper-III                | 2.5       | -- | --        | 50                    | 40          | 10         | 4.0       |
|  |  |          | Paper-IV                 | 2.5       | -- | --        | 50                    | 40          | 10         |           |
|  | DSC 3B                                       |          | Paper-III                | 2.5       | -- | --        | 50                    | 40          | 10         | 4.0       |
|  |  |          | Paper-IV                 | 2.5       | -- | --        | 50                    | 40          | 10         |           |
|  | DSC 4B                                       |          | Paper-III                | 2.5       | -- | --        | 50                    | 40          | 10         | 4.0       |
|  |  | Paper-IV | 2.5                      | --        | -- | 50        | 40                    | 10          |            |           |
|  | Democracy, Elections and Good Governance     |          |                          | 3         |    |           | 50                    | 40          | 10         | NC        |
| <b>Total (Theory)</b>  |  |          |                          | <b>24</b> | -- | --        | <b>450</b>            | <b>360</b>  | <b>90</b>  | <b>18</b> |
| <b>Core Practical</b>  | DSC 1 A & 1B                                 |          | Practical I              | --        | -- | 4         | 100                   | 80          | 20         | 4.0       |
|  | DSC 2 A & 2B                                 |          | Practical I              | --        | -- | 4         | 100                   | 80          | 20         | 4.0       |
|  | DSC 3A & 3B                                  |          | Practical I              | --        | -- | 4         | 100                   | 80          | 20         | 4.0       |
|  | DSC 4A & 4B                                  |          | Practical I              | --        | -- | 4         | 100                   | 80          | 20         | 4.0       |
| <b>Total (Pract.)</b>  |  |          |                          |           |    | <b>16</b> | <b>400</b>            | <b>320</b>  | <b>80</b>  | <b>16</b> |
| <b>Grand Total</b>   |  |          |                          | <b>48</b> |    | <b>16</b> | <b>1300</b>           | <b>1040</b> | <b>260</b> | <b>52</b> |

\*Core Courses: Chemistry/ Physics/ Mathematics/ Statistics/ Botany/ Zoology/ Microbiology/ Electronics/ Computer Science/ Geology/ Geography/ Psychology

**Punyashlok Ahilyadevi Holkar Solapur University, Solapur**

Faculty of Science & Technology

**Choice Based Credit System (CBCS) (w.e.f. 2023-24)**

Revised Structure for B. Sc-II

| Subject/<br>Core Course   | Name and Type of the Paper |             | No. of papers/<br>Practical | Hrs./week |    |           | Total Marks<br>Per Paper | UA         | CA         | Credits   |
|---|----------------------------|-------------|-----------------------------|-----------|----|-----------|--------------------------|------------|------------|-----------|
|   | Type                       | Name        |                             | L         | T  | P         |                          |            |            |           |
| <b>Class: B.Sc.- II Semester – III</b>  |                            |             |                             |           |    |           |                          |            |            |           |
| <b>Core Courses</b><br>(*Students can opt any Three subjects among the Four Subjects offered at B. Sc. I.<br><b>OR</b><br>Students can opt any Two subjects among the Four Subjects offered at B. Sc. I and any one from the Additional Interdisciplinary subjects. | DSC 1C                     | AIC-1A      | Paper-V                     | 3         | -- | --        | 50                       | 40         | 10         | 4.0       |
|   |                            |             | Paper-VI                    | 3         | -- | --        | 50                       | 40         | 10         |           |
|   | DSC 2C                     |             | Paper-V                     | 3         | -- | --        | 50                       | 40         | 10         | 4.0       |
|   |                            |             | Paper-VI                    | 3         | -- | --        | 50                       | 40         | 10         |           |
|   | DSC 3C                     |             | Paper-V                     | 3         | -- | --        | 50                       | 40         | 10         |           |
|   |                            | Paper-VI    | 3                           | --        | -- | 50        | 40                       | 10         |            |           |
| <b>Total Sem.-III</b>   |                            |             |                             | <b>18</b> | -- | --        | <b>300</b>               | <b>240</b> | <b>60</b>  | <b>12</b> |
| \$ SEC-1  |                            |             |                             | 4         | -- | --        | 100                      | 80         | 20         | 4         |
| <b>Class: B.Sc.- II Semester –IV</b>  |                            |             |                             |           |    |           |                          |            |            |           |
| <b>Core Courses</b><br>(*Students can opt any Three subjects among the Four Subjects offered at B.Sc. I.<br><b>OR</b><br>Students can opt any Two subjects among the Four Subjects offered at B.Sc. I and any one from the Additional Interdisciplinary subjects.   | DSC 1D                     | AIC-1B      | Paper-VII                   | 3         | -- | --        | 50                       | 40         | 10         | 4.0       |
|   |                            |             | Paper-VIII                  | 3         | -- | --        | 50                       | 40         | 10         |           |
|   | DSC 2D                     |             | Paper-VII                   | 3         | -- | --        | 50                       | 40         | 10         | 4.0       |
|   |                            |             | Paper-VIII                  | 3         | -- | --        | 50                       | 40         | 10         |           |
|   | DSC 3D                     |             | Paper-VII                   | 3         | -- | --        | 50                       | 40         | 10         |           |
|   |                            |             | Paper-VIII                  | 3         | -- | --        | 50                       | 40         | 10         |           |
| Environmental Studies   |                            |             |                             | 3         | -- | --        | 50                       | 40         | 10         | NC        |
| <b>Total Sem-IV</b>   |                            |             |                             | <b>18</b> |    |           | <b>300</b>               | <b>240</b> | <b>60</b>  | <b>12</b> |
| <b>Total (Theory)</b>   |                            |             |                             | <b>36</b> | -- | --        | <b>600</b>               | <b>480</b> | <b>120</b> | <b>24</b> |
| <b>Core Practical</b>   | DSC 1C & 1D                | AIC 1A & 1B | Pr. II & III                | --        | -- | 8         | 200                      | 160        | 40         | 4.0       |
|   | DSC 2C & 2D                |             | Pr. II & III                | --        | -- | 8         | 200                      | 160        | 40         | 4.0       |
|   | DSC 3C & 3D                |             | Pr. II & III                | --        | -- | 8         | 200                      | 160        | 40         | 4.0       |
| <b>Total (practical)</b>  |                            |             |                             |           |    | <b>24</b> | <b>600</b>               | <b>480</b> | <b>120</b> | <b>24</b> |
| <b>Grand Total</b>  |                            |             |                             | <b>36</b> |    | <b>24</b> | <b>1200</b>              | <b>960</b> | <b>240</b> | <b>48</b> |
| \$ SEC-1  |                            |             |                             | 4         |    |           | 100                      | 80         | 20         | 4         |

**\*Core Courses: Chemistry/ Physics/ Mathematics/ Statistics/ Botany/ Zoology/ Microbiology/ Electronics/ Computer Science/ Geology/ Geography/ Psychology**  
**Additional Interdisciplinary Courses - Geochemistry/ Biochemistry/ Meteorology/ Plant Protection/ NCC etc.**

**\$The students can choose MOOCs/ NPTEL/ SWAYAM/ Path Shala/ Add-on / Skill based courses of university/ college-initiated courses of same credits.**

**\$ These courses are not compulsory, but after completion of these courses' students get additional credits on their mark lists.**

**\$ SEC courses run by colleges should be communicated to university for information & necessary action.**

---

## Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Faculty of Science & Technology

Choice Based Credit System (CBCS) (w.e.f.2024-25) Revised Structure for B. Sc- III

| Subject/ Core Course   | Name and Type of the Paper     |      | No. of papers/ Practical | Hrs./week |           |           | Total Marks Per Paper | UA          | CA         | Credits   |
|--|--------------------------------|------|--------------------------|-----------|-----------|-----------|-----------------------|-------------|------------|-----------|
|  | Type                           | Name |                          | L         | T         | P         |                       |             |            |           |
| <b>Class:</b>  | <b>B.Sc.- III Semester - V</b> |      |                          |           |           |           |                       |             |            |           |
| Ability Enhancement Course (AECC)  | English (Business English)     |      | Paper II Part A          | 4         | --        | --        | 50                    | 40          | 10         | 2.0       |
| <b>Core Courses:</b>   | DSC 1 E                        |      | Paper IX                 | 4         | --        | --        | 100                   | 80          | 20         | 4.0       |
| (Students can opt any one subjects among the three Subjects excluding Interdisciplinary/Additional subject offered at B. Sc-II.) | DSC 1 F                        |      | Paper X                  | 4         | --        | --        | 100                   | 80          | 20         | 4.0       |
|  | DSC 1 G                        |      | Paper XI                 | 4         | --        | --        | 100                   | 80          | 20         | 4.0       |
|  | DSE 1 A/B/C                    |      | Paper XII                | 4         | --        | --        | 100                   | 80          | 20         | 4.0       |
| <b>Total Theory Sem-V</b>  |                                |      |                          | <b>20</b> | <b>--</b> | <b>--</b> | <b>450</b>            | <b>360</b>  | <b>90</b>  | <b>18</b> |
|  | \$ SEC-2                       |      |                          | 4         | --        | --        | 100                   | 80          | 20         | 4.0       |
| <b>Class:</b>  | <b>B.Sc.- III Semester –VI</b> |      |                          |           |           |           |                       |             |            |           |
| Ability Enhancement Course (AECC)  | English (Business English)     |      | Paper II Part B          | 4         | --        | --        | 50                    | 40          | 10         | 2.0       |
| <b>Core Courses:</b>   | DSC 1 H                        |      | Paper XIII               | 4         | --        | --        | 100                   | 80          | 20         | 4.0       |
| (Students can opt anyone subjects among the three Subjects excluding interdisciplinary / Additional subject offered at B.Sc. II. | DSC 1 I                        |      | Paper XIV                | 4         | --        | --        | 100                   | 80          | 20         | 4.0       |
|  | DSC 1 J                        |      | Paper XV                 | 4         | --        | --        | 100                   | 80          | 20         | 4.0       |
|  | DSE 2 A/B/C                    |      | Paper XVI                | 4         | --        | --        | 100                   | 80          | 20         | 4.0       |
| <b>Total Theory Sem-VI</b>   |                                |      |                          | <b>20</b> | <b>--</b> | <b>--</b> | <b>450</b>            | <b>360</b>  | <b>90</b>  | <b>18</b> |
| <b>Core</b>  | DSC 1E & 1H                    |      | Practical IV             | --        | --        | 5         | 100                   | 80          | 20         | 4.0       |
|  | DSC 1F & 1 I                   |      | Practical V              | --        | --        | 5         | 100                   | 80          | 20         | 4.0       |
|  | DSC 1G & 1 J                   |      | Practical VI             | --        | --        | 5         | 100                   | 80          | 20         | 4.0       |
|  | DSE 1A/B & 2 A/B               |      | Practical VII            | --        | --        | 5         | 100                   | 80          | 20         | 4.0       |
| <b>Total (Practicals)</b>  |                                |      |                          |           |           | <b>20</b> | <b>400</b>            | <b>320</b>  | <b>80</b>  | <b>16</b> |
| <b>Grand Total</b>   |                                |      |                          | <b>40</b> |           | <b>20</b> | <b>1300</b>           | <b>1040</b> | <b>260</b> | <b>52</b> |
|  | \$ SEC- 2                      |      |                          | <b>4</b>  |           |           | <b>100</b>            | <b>80</b>   | <b>20</b>  | <b>4</b>  |

**\$The students can choose MOOCs/ NPTEL/SWAYAM/Pathshala/Add-on / Skill based courses of university/college-initiated courses of same credits.**

**\$ These courses are not compulsory, but after completion of these courses students get additional credits on their Mark lists. \$SEC Courses initiated by colleges should be communicated to university for information and necessary action.**

## Summary of the Structure of B.Sc. Program as per CBCS pattern

| Class            | Semester          | Marks-Theory | Credits-Theory | Marks-Practical | Credits-Practical's | Total - credits |
|------------------|-------------------|--------------|----------------|-----------------|---------------------|-----------------|
| <b>B.Sc.-I</b>   | I                 | 450          | 18             | --              | --                  | 18              |
|                  | II                | 450          | 18             | 400             | 16                  | 34              |
| <b>B.Sc.-II</b>  | III               | 300          | 12             | --              | --                  | 12              |
|                  | IV                | 300          | 12             | 600             | 24                  | 36              |
| <b>B.Sc.-III</b> | V                 | 450          | 18             | --              | --                  | 18              |
|                  | VI                | 450          | 18             | 400             | 16                  | 34              |
| <b>Total</b>     |                   | 2400         | 96             | 1400            | 56                  | 152             |
|                  | SEC sem.- III & V | 200          | 8              |                 |                     | 8               |

### B. Sc. Programme:

**Total Marks** : Theory + Practicals = 2400(+200) +1400 =3800+200

**Credits** : Theory + Practicals = 96(08) + 56 = 152+08

**Numbers of Papers** Theory: Ability Enhancement Compulsory Course (AECC) 04

Theory: Discipline Specific Core Paper (DSC) 20

Theory: Discipline Specific Elective paper (DSE) 02

Skill Enhancement Course (SEC) 04

**Total** : Theory Papers (Core paper-22) 30

: Practical Papers 11

### Abbreviations:

L: Lectures T: Tutorials P: Practical UA: University Assessment CA: College Assessment CC:

Core Course AEC: Ability Enhancement Course DSE: Discipline Specific Elective Paper SEC:

Skill Enhancement Course, AIC: Additional Interdisciplinary Courses

Note: Each theory papers of 50 Marks should be of two Units.

Each theory papers of 100 Marks should be of four Units.

Each theory paper Unit is of 15 Lectures.

Practical paper of 100 Marks is of at least 20 practicals.

## Equivalent Subject for Old Syllabus

| <b>Sr. No.</b> | <b>Name of the Old Paper</b> | <b>Name of the New Paper</b> |
|----------------|------------------------------|------------------------------|
| 1)             | Microbiology & Phycology     | Microbiology & Phycology     |
| 2)             | Fungi & Archegoniate         | Fungi & Archegoniate         |
| 3)             | Plant Ecology                | Plant Ecology                |
| 4)             | Taxonomy of Angiosperms      | Taxonomy of Angiosperms      |

# Punyashlok Ahilyadevi Holkar Solapur University, Solapur

## BOS Section

### The following points required in the syllabus:

- 1) **Introduction:** This course includes four papers Paper I: Microbiology & Phycology Paper II: Fungi & Archegoniate Paper III: Plant ecology & Paper IV: Taxonomy of Angiosperms. Each paper consists of two units. All these papers help students to improve their basic knowledge about microbes, algae, fungi, ecology, and Taxonomy.
- 2) **Advantages of Course:** All these papers will be helpful to improve their skills in microbiology field, identification of algae, fungi, and different plant species their ecological & medicinal importance. Practical based on these papers will be helpful to develop skills & understanding all the basic loopholes in every technique. These papers act as baseline to their next year studies.
- 3) **Objectives of the Course:** To get the knowledge about the characters, structure, and economic importance of viruses. Knowledge about the forms, size, and diversity of bacteria and about the Mycoplasma, knowledge about the characters, classification, and economic importance of algae. To get the knowledge about the general characters, occurrence, classification, thallus organization & reproduction of Cyanophyta division along with the example *Nostoc*, of Chlorophyta division along with the example *Spirogyra*. To get the knowledge about characters, mode of nutrition & classification of the true fungi. To get the knowledge about the fungal division Zygomycota, Ascomycotina, To get knowledge about introduction & general characters of Archegoniate get the knowledge about the Bryophytes with suitable example, get the knowledge about the Pteridophytes with suitable example, get the knowledge about the Gymnosperms with suitable example. To get the knowledge about the climatic and edaphic factors of environment, ecological adaptations, the forms & structure of community along with qualitative and quantitative characters of community, To get the knowledge about introduction, components of ecosystem, ecological pyramids with food chain and food webs, about the ecological succession, To get knowledge about different concepts in taxonomy understand different classification systems and its merit & demerits, understand identification methods, nomenclature, principles and rules of ICBN, technique of herbarium preparation and its significance, study morphological & reproductive characters of families.

### 4) List of books recommended:

1. Lee, R.E. (2008). Phycology, Cambridge University Press, Cambridge. 4<sup>th</sup> edition.
2. Prescott, L.M., Harley J.P., Klein D. A. (2005). Microbiology, Mc Graw Hill, India. 6<sup>th</sup> edition.



3. Kumar, H.D. (1999). Introductory Phycology. Affiliated East-West Press, Delhi.
4. Sahoo, D. (2000). Farming the ocean: seaweeds cultivation and utilization. Aravali International, New Delhi.
5. Campbell, N.A., Reece J.B., Urry L.A., Cain M.L., Wasserman S.A. Minorsky P.V., Jackson R.B. (2008). Biology, Pearson Benjamin Cummings, USA. 8th edition.
6. Pelczar, M.J. (2001) Microbiology, 5th edition, Tata Mc Graw-Hill Co, New Delhi.
7. Vashistha, P.C., Sinha, A.K., Kumar, A. (2010). Pteridophyta. S. Chand. Delhi, India.
8. Bhatnagar, S.P. & Moitra, A. (1996). Gymnosperms. New Age International (P) Ltd Publishers, New Delhi, India.
9. Parihar, N.S. (1991). An introduction to Embryophyta: Vol. I. Bryophyta. Central Book Depot. Allahabad.
10. Raven, P.H., Johnson, G.B., Losos, J.B., Singer, S.R. (2005). Biology. Tata McGraw Hill, Delhi.
11. Vander-Poorteri 2009 Introduction to Bryophytes. COP.
12. Agrios, G.N. 1997 Plant Pathology, 4th edition, Academic Press, U.K.
13. Alexopoulos, C.J., Mims, C.W., Blackwell, M. (1996). Introductory Mycology, John Wiley & Sons (Asia) Singapore. 4th edition.
14. Webster, J. and Weber, R. (2007). Introduction to Fungi, Cambridge University Press, Cambridge. 3rd edition.
15. Sethi, I.K. and Walia, S.K. (2011). Textbook of Fungi and Their Allies, Macmillan Publishers India Ltd.
16. Sharma, P.D. (2011). Plant Pathology, Rastogi Publication, Meerut, India.
17. Lee, R.E. (2008). Phycology, Cambridge University Press, Cambridge. 4<sup>th</sup> edition.
18. Prescott, L.M., Harley J.P., Klein D. A. (2005). Microbiology, McGraw Hill, India. 6<sup>th</sup> edition.
19. Kumar, H.D. (1999). Introductory Phycology. Affiliated East-West Press, Delhi.
20. Sahoo, D. (2000). Farming the ocean: seaweeds cultivation and utilization. Aravali International, New Delhi.
21. Campbell, N.A., Reece J.B., Urry L.A., Cain M.L., Wasserman S.A. Minorsky P.V., Jackson R.B. (2008). Biology, Pearson Benjamin Cummings, USA. 8th edition.
22. Pelczar, M.J. (2001) Microbiology, 5<sup>th</sup> edition, Tata McGraw-Hill Co, New Delhi
23. Kormondy, E.J. (1996). Concepts of Ecology. Prentice Hall, U.S.A. 4th edition.
24. Sharma, P.D. (2010) Ecology and Environment. Rastogi Publications, Meerut, India. 8<sup>th</sup> edition.
25. Odum, E.P. Ecology. Oxford & F. B. h. Publishing Co. pvt. LTD-New Delhi.
26. Barbour, M.G., Burk, J.H. and Pitts, W.D. 1987. Terrestrial Plant Ecology. Benjamin Cummings Publication Co., California.
27. Kormondy, E.J. 1996. Concepts of Ecology, Prentice-Hall of India Pvt. Ltd., New Delhi.
28. Hill, M.K. 1997. Understanding Environmental Pollution. Cambridge University Press.
29. Mackenzie, A. et al. 1999. Instant Notes in Ecology. Viva Books Pvt. Ltd., New Delhi.
30. Ashok Bendre / Ashok Kumar Economic Botany Rastogi Publications Shivaji Road, Meerut – 250002 India.
31. Prof. M.A. Khan – Environment, Biodiversity and Conservation S-B Nangia, A.P.H. Publishing Corporation, 5, Ansari Road, Daryaganj New Delhi – 110002.
32. B.P. Pandey – Modern Practical Botany Vol – I / II Chand & Company Ltd. Ramnagar New Delhi – 110055.
33. R.S. Shukla & P. S. Chandel. Plant Ecology. S. Chand & Company LTD. Ram Nagar, New

Delhi.110055.

34. Pavas Divan – Environ Protection – Deep & Deep Publications D-I 124, RajouriGarden,New Delhi – 110027.
35. P.S. Verma / V.K. Agrawal – Concept of Ecology, S. Chand & Lonpan Ltd. Ramnagar,New Delhi – 110055.
36. Eug Warming – Ecology of Plants, Ambey Publications Delhi (India)
37. Evgene P Odum – Ecology Oxford & IBH Publishing Co. Pvt. Ltd. Culcutta, New Delhi.
38. Ishwar Prakash. Desert Ecology. Scientific Publications, Ratandas Road,Jodhpur.-342001-India.
39. T.W. Woodhead. Plant Ecology. SonaliPublications.New Delhi.110002.
40. Eug. Warming. Ecology of Plant. Ambey Publications Delhi.
41. Jonathan Silvertown. Introduction To Population Plant Ecology. Longman Singapore. Publisher, LTD.
42. Morphology of Angiosperms, J M Coulter and C J Chamberlain, Pointer Publishers, Jaipur.
43. Taxonomy of Angiosperm R Pandey, S Chand and Co. Ltd, Ramnagar New Delhi.110055
44. An Introduction to Taxonomy of Angiosperms- Pritish Shukla, Shital P Mishra, VikasPublishing House, Pvt. Ltd. Gaziabad, UP.
45. A Text Book of Angiosperms-B P Pandey, S Chand and Co Ltd. Ramnagar, NewDelhi.110055
46. A Text Book of Botany -‘Angiosperm,V Singh C Pande, D K Jain, Rastogi Publication,Shivaji Road Meerut.250002
47. Taxonomy of Angiosperm, Neeru Mathur, Sonali Publications, New Delhi, 110002.
48. Angiosperms-G L Chopra, Pradeep Publications, Jalandhar, 144008.
49. Simpson, M.G. (2006). *Plant Systematics*. Elsevier Academic Press, San Diego, CA,U.S.A.
50. Singh, G. (2012). *Plant Systematics: Theory and Practice*. Oxford & IBH Pvt. Ltd., NewDelhi. 3<sup>rd</sup> edition.
51. Jeffrey, C. (1982). An introduction to plant Taxonomy, Cambridge University Press,Cambridge.
52. Judd, W.S., Campbell, C.S., Kellog, E.A., Steven, P.F. (2002). *Plant Systematics-A Phylogenetic approach*. Sinauer Associates Inc., U.S.A. 2nd edition
53. Maheshwari j.k. (1963). *Flora of Delhi*. CSIR, New Delhi.
54. Simpson, M.G. (2006). *Plant Systematics*. Elsevier Academic Press, San Diego, CA,U.S.A.
55. Singh, G. (2012). *Plant Systematics: Theory and Practice*. Oxford & IBH Pvt. Ltd., NewDelhi. 3<sup>rd</sup> edition.
56. Gaikwad, S. P. & Garad, K. U. (2015). *Flora of Solapur District*, Laxmi Book PublicationSolapur.

**5) List of Laboratory Equipments, Instruments, Measurements etc.**

Compound microscope

Dissecting microscope

**17. Rules and regulations and ordinance if any As per PAH Solapur University Solapur**

**18. Medium of the language: English**

**19. Structure of the Course:**

- A. Each paper of every subject for Arts, Social Sciences & Commerce Faculty shall be of 50 marks as resolved by the respective faculties and Academic Council.
- B. For science faculty subjects each paper shall be of 100 marks and practical for every subject shall be of 100 Marks as resolved in the faculty and Academic Council.
- C. For B. Pharmacy also the paper shall be of 50 marks for University examination. Internalmarks will be given in the form of grades.
- D. For courses which were in semester pattern will have their original distribution already of marks for each paper.
- E. For the faculties of Education, Law, Engineering the course structure shall be as per there solutions of the respective faculties and Academic Council.
- F. Practical Examination for B. Sc. I. will be conducted at the end of second semester.
- G. Examination fees for semester examination will be decided in the Board of Examinations. The structures of all courses in all faculties were approved and placed before the Academic Council. After considered deliberations and discussion it was decided not to convene a meeting of the Academic Council for the same matter as there is no deviation from any decision taken by Faculties and Academic Council. Nature of question paper approved by Hon. Vice Chancellor on behalf of the Academic Council.
- H. Each paper of every subject for Arts, Social Sciences & Commerce Faculty shall be of 50 marks as resolved by the respective faculties and Academic Council.
- I. For Science Faculty subjects each paper shall be of 100 marks and practical for every subject shall be of 100 Marks as resolved in the faculty and Academic Council.
- J. For B. Pharmacy also the paper shall be of 50 marks for University examination. Internalmarks will be given in the form of grades.

K. For courses which were in semester pattern will have their original distribution already of marks for each paper.

L. For the faculties of Education, Law, Engineering the course structure shall be as per the resolutions of the respective faculties and Academic Council.

**20. Allotment of workload (Theory/Practical)**

**21. Staffing of pattern** –As per UGC rules.

**22. Intake capacity of students**

**23. Paper duration** –two hours

**24. To be introduced from:** June 2022

**PUNYASHLOK AHILYADEVI HOLKAR**  
**Solapur University, Solapur**  
**Faculty of Science**  
**Choice Based Credit System (CBCS), (W. E. F. June 2022)**  
**Structure for B. Sc-I**  
**\*Core Subjects: Botany**

---

**Objective and Outcome of the Course Syllabus of B. Sc.-I, CBCS Pattern**  
**Botany, w.e.f. June-2022**  
**DSC -1-A**

---

**Semester- I**

---

**Paper No-I: Microbiology and Phycology**

---

**Unit 1: Introduction of Microbiology**

**Objective:** To get the knowledge about the basic concepts in microbiology

**Outcome:** The student can understand the basic concept of microbiology:

**Microbes**

**Objective:** To get the knowledge about the characters, structure, and economic importance of viruses. Knowledge about the forms, size, and diversity of bacteria and about the Mycoplasma.

**Outcome:** The student can understand in detail about the viruses, diversity of bacteria and about the Mycoplasma

**Unit 2 : Phycology**

**Objective:** To get the knowledge about the characters, classification, and economic importance of algae

**Outcome:** The student can understand importance of algae

**Cyanophyta**

**Objective:** To get the knowledge about the general characters, occurrence, classification, Thallus organization & reproduction of Cyanophyta division along with the example *Nostoc*.

**Outcome:** The student can understand in detail about the division Cyanophyta along with example of *Nostoc*.

**Xanthophyta**

**Objective:** To get the knowledge about the general characters, occurrence, classification, Thallus organization & reproduction of Cyanophyta division along with the example *Vaucheria*.

**Outcome:** The student can understand in detail about the division Cyanophyta along example of *Vaucheria*

**Chlorophyta**

**Objective:** To get the knowledge about the general characters, occurrence, classification, Thallus organization & reproduction of chlorophyta division along with the example *Nostoc*.

**Outcome:** The student can understand in detail about the division chlorophyta along with example of *Spirogyra*

### **Rhodophyta**

**Objective:** To get the knowledge about the general characters, occurrence, classification, Thallus organization & reproduction of chlorophyta division along with the example *Polysiphonia*.

**Outcome:** The student can understand in detail about the division chlorophyta along example of *Polysiphonia*

---

## Paper -II

### Fungi and Archegoniate

---

#### Unit 1: Fungi

**Objective:** To get the knowledge about characters, mode of nutrition & classification of the true fungi.

**Outcome:** The student can understand about the general introduction of true fungi.

#### Zygomycotina

**Objective:** To get the knowledge about the fungal division Zygomycotina

**Outcome:** The student can understand about division of Zygomycotina.

#### Ascomycotina

**Objective:** To get the knowledge about the fungal division Ascomycotina.

**Outcome:** The student can understand about the division of Ascomycotina

#### Unit 2: Archegoniate

**Objective:** To get Knowledge about Introduction & general characters of Archegoniate

**Outcome:** The student gets a detailed idea about Archegoniate

#### Bryophytes

**Objective:** To get the knowledge about the Bryophytes with suitable example

**Outcome:** The student can understand about the Bryophytes and life cycle of *Riccia* with its economic importance.

#### Pteridophyta

**Objective:** To get the knowledge about the Pteridophytes with suitable example.

**Outcome:** The student can understand about the Pteridophytes and life cycle of *Selaginella* with its economic importance.

#### Gymnosperms

**Objective:** To get the knowledge about the Gymnosperms with suitable example.

**Outcome:** The student can understand about the Gymnosperms and life cycle of *Cycas* with its economic importance.

---

## Paper No. III Plant Ecology

---

### Unit 1: Introduction

**Objective:** To get the knowledge about the climatic and Edaphic factors of environment

**Outcome:** The student can understand about the Climatic and Edaphic factors of environment.

### Ecological Adaptations

**Objective:** To get the knowledge about the ecological adaptations.

**Outcome:** The student can understand about the ecological adaptations in plants.

### Unit 2: Plant communities

**Objective:** To get the knowledge about the forms & structure of community along with qualitative and quantitative characters of community.

**Outcome:** The student can understand about the plant communities

### Ecology

**Objective:** To get the knowledge about introduction, components of ecosystem, ecological pyramids with food chain and food webs.

**Outcome:** The student can understand about the concepts of ecology

### Ecological succession

**Objective:** To get the knowledge about the ecological succession

**Outcome:** The student can understand about the ecological succession

---



**PAPER IV**  
**Taxonomy of Angiosperms**

---

**Unit 1: Introduction**

**Objective:** To get knowledge about different concepts in taxonomy

**Outcome:** The student can understand about importance of taxonomy

**Classification**

**Objective:** To understand different classification systems and its merit & demerits

**Outcome:** The student can understand about classification systems in taxonomy

**Unit 2: Identification and nomenclature**

**Objective:** To understand Identification methods, Nomenclature, Principles and Rules of ICBN

**Outcome:** The student can understand different methods of classification and rules of nomenclature

**Herbarium and Botanical Garden**

**Objective:** To understand technique of herbarium preparation and significance

**Outcome:** The student can understand technique and botanical gardens in India

**Study of Angiosperm families**

**Objective:** To study morphological & reproductive characters of 4 families

**Outcome:** The student can understand detailed identifying characters of family

## Syllabus of B. Sc. Part-I, CBCS Pattern

Botany, w.e.f. June-2022

DSC- 1 -A Semester- I

---

### Paper No-I: Microbiology & Phycology (Lecture 30)

---

#### Unit- 1: Microbiology

- 1.1- Introduction- Microbiology (2 L)
- 1.2- Viruses: General characters, structure, classification, and economic importance of viruses. (3 L)
- 1.3- DNA virus: (T- Phage), RNA Virus (TMV). (2 L)
- 1.4- Bacteria: General characters of bacteria, structure, Economic importance, Modes of reproduction vegetative, asexual & recombination (conjugation, transformation & transduction). (5 L)
- 1.5- Mycoplasma: General characters, Structure, classification and significance, Economic importance. (3 L)

#### Unit- 2: Phycology

- 2.1- Introduction; general characters and classification of algae (As per Smith-1955) up to class; Economic Importance of Algae. (3 L)
- 2.2- Cyanophyta: General Characters; Study of *Nostoc*- occurrence, classification, thallus structure and reproduction (excluding developmental stages). (3 L)
- 2.3- Xanthophyta: General characters; Study of *Vaucheria*- occurrence, classification, thallus structure and reproduction (excluding developmental stages). (3 L)
- 2.4- Chlorophyta: General Characters; Study of *Spirogyra*- occurrence, classification, thallus structure and reproduction (excluding developmental stages). (3 L)
- 2.5- Phaeophyta: General characters & life cycle of *Sargassum* occurrence, classification, thallus structure and reproduction (excluding developmental stages). (3 L)
-

• **References Book**

1. Lee, R.E. (2008). Phycology, Cambridge University Press, Cambridge. 4th edition.
  2. Prescott, L.M., Harley J.P., Klein D. A. (2005). Microbiology, Mc Graw Hill, India. 6th edition.
  3. Kumar, H.D. (1999). Introductory Phycology. Affiliated East-West Press, Delhi.
  4. Sahoo, D. (2000). Farming the ocean: seaweeds cultivation and utilization. Aravali International, New Delhi.
  5. Campbell, N.A., Reece J.B., Urry L.A., Cain M.L., Wasserman S.A. Minorsky P.V., Jackson R.B. (2008). Biology, Pearson Benjamin Cummings, USA. 8th edition.
  7. Pelczar, M.J. (2001) Microbiology, 5th edition, Tata Mc Graw-Hill Co, New Delhi.
-

---

## Paper-II: Fungi & Archegoniate (Lecture 30)

---

### Unit- 1: Fungi (15 L)

1.1- General characters; Nutrition and classification of fungi up to class (as per Ainsworth); Economic importance of Fungi. (3 L)

1.2- Zygomycotina: General characters; study of *Mucor*- occurrence, thallus organization, classification, and life cycle (excluding developmental stages). (3 L)

1.3- Ascomycotina: General characters; study of *Yeast*- occurrence, thallus organization, classification, and life cycle (excluding developmental stages). (3 L)

1.4- Basidiomycotina: General characters: study of *Agaricus* occurrence, thallus organization, classification, and life cycle (excluding developmental stages). (3 L)

1.5- Oomycota: General characters: Study of *Albugo*- occurrence, thallus organization, classification, and life cycle (excluding developmental stages). (3 L)

### Unit- 2: Archegoniate (15 L)

2.1- Introduction & General character. (2 L)

2.2- Bryophytes: General characters and Classification (as per G. M. Smith); Study of *Riccia*- occurrence, classification, thallus structure (external & internal), and reproduction (excluding development); Economic importance of Bryophytes. (3 L)

2.3- Pteridophytes: General characters and classification up to class (as per G. M. Smith); Study of *Selaginella*- occurrence, classification, morphology of sporophyte, anatomy (stem) and reproduction (excluding development); Economic importance of Pteridophyte. (3 L)

2.4- **Gymnosperms**: General characters and classification (As per Sporne). (2 L)

2.5- Study of *Cycas*- classification, occurrence, morphology (sporophyte, corolloid root), anatomy of leaflet and reproduction (excluding development); Economical importance of Gymnosperms. (5 L)

---

• **References Book**

1. Vashistha, P.C., Sinha, A.K., Kumar, A. (2010). Pteridophyta. S. Chand. Delhi, India.
2. Bhatnagar, S.P. & Moitra, A. (1996). Gymnosperms. New Age International (P) Ltd Publishers, New Delhi, India.
3. Parihar, N.S. (1991). An introduction to Embryophyta: Vol. I. Bryophyta. Central Book Depot. Allahabad.
4. Raven, P.H., Johnson, G.B., Losos, J.B., Singer, S.R. (2005). Biology. Tata McGraw Hill, Delhi.
5. Vander-Poorteri 2009 Introduction to Bryophytes. COP.
6. Agrios, G.N. 1997 Plant Pathology, 4th edition, Academic Press, U.K.
7. Alexopoulos, C.J., Mims, C.W., Blackwell, M. (1996). Introductory Mycology, John Wiley & Sons (Asia) Singapore. 4th edition.
8. Webster, J. and Weber, R. (2007). Introduction to Fungi, Cambridge University Press, Cambridge. 3rd edition.
9. Sethi, I.K. and Walia, S.K. (2011). Text book of Fungi and Their Allies, Macmillan Publishers India Ltd.
10. Sharma, P.D. (2011). Plant Pathology, Rastogi Publication, Meerut, India.
11. Lee, R.E. (2008). Phycology, Cambridge University Press, Cambridge. 4th edition.
12. Prescott, L.M., Harley J.P., Klein D. A. (2005). Microbiology, McGraw Hill, India. 6th edition.
13. Kumar, H.D. (1999). Introductory Phycology. Affiliated East-West Press, Delhi.
14. Sahoo, D. (2000). Farming the ocean: seaweeds cultivation and utilization. Aravali International, New Delhi.
15. Campbell, N.A., Reece J.B., Urry L.A., Cain M.L., Wasserman S.A. Minorsky P.V., Jackson R.B. (2008). Biology, Pearson Benjamin Cummings, USA. 8th edition.
16. Pelczar, M.J. (2001) Microbiology, 5th edition, Tata McGraw-Hill Co, New Delhi.

# **Syllabus of B.Sc. Part-I, CBCS Pattern Botany**

**Botany, w.e.f. June-2022**

**DSC- 1-A Semester- II**

---

## **Paper No-III: Plant Ecology (Lecture 30)**

---

|   |               |
|---|---------------|
| <b>Unit 1: Introduction, Climatic Factor &amp; Ecological Adaptations</b>   | <b>(15 L)</b> |
| 1.1- Basic concept; levels of organization; interaction between living world & environment.   | <b>(3 L)</b>  |
| 1.2. Climatic factors- Light, Temperature, Humidity, Wind & Rainfall.   | <b>(3 L)</b>  |
| 1.3. Edaphic factors- Soil: origin, formation, composition, physical, chemical & biological components, classification & chemical properties of soil. | <b>(4 L)</b>  |
| 1.4. Ecological adaptations: Introduction.  | <b>(1 L)</b>  |
| 1.5. Hydric Adaptations, Xeric Adaptations.   | <b>(4 L)</b>  |
| <br>  |               |
| <b>Unit 2: Plant communities, Ecosystem &amp; Ecological succession</b>   | <b>(15)</b>   |
| 2.1. Plant Communities: Introduction, forms & structure, classification, qualitative and quantitative characters of community.                        | <b>(4 L)</b>  |
| 2.2 Ecosystem: Introduction, components of ecosystem, ecological pyramids, food chain and food webs.  | <b>(4 L)</b>  |
| 2.3. Trophic level organization, basic source of energy, autotrophy, heterotrophy, symbiosis, commensalism, parasitism.                               | <b>(4 L)</b>  |
| 2.4. Ecological succession: Introduction, concept & process.  | <b>(1 L)</b>  |
| 2.5. Hydrosere and Xerosere.  | <b>(2 L)</b>  |

---

• **References-**

1. Kormondy, E.J. (1996). Concepts of Ecology. Prentice Hall, U.S.A. 4th edition.
  2. Sharma, P.D. (2010) Ecology and Environment. Rastogi Publications, Meerut, India. 8th edition.
  3. Odum, E.P. Ecology. Oxford & F. B. h. Publishing Co. pvt. LTD- New Delhi.
  4. Barbour, M.G., Burk, J.H. and Pitts, W.D. 1987. Terrestrial Plant Ecology. Benjamin Cummings Publication Co., California.
  5. Kormondy, E.J. 1996. Concepts of Ecology, Prentice-Hall of India Pvt. Ltd., New Delhi.
  6. Hill, M.K. 1997. Understanding Environmental Pollution. Cambridge University Press.
  7. Mackenzie, A. et al. 1999. Instant Notes in Ecology. Viva Books Pvt. Ltd., New Delhi.
  8. Ashok Bendre / Ashok Kumar Economic Botany Rastogi Publications Shivaji Road, Meerut
  9. 250002 India.
  10. Prof. M.A. Khan – Environment, Biodiversity and Conservation S-B Nangia, A.P.H. Publishing Corporation, 5, Ansari Road, Daryaganj New Delhi – 110002.
  11. B.P. Pandey – Modern Practical Botany Vol – I / II Chand & Company Ltd. Ramnagar New Delhi – 110055.
  12. R.S. Shukla & P. S. Chandel. Plant Ecology. S. Chand & Company LTD. Ram Nagar, New Delhi.110055.
  13. Pavas Divan – Environ Protection – Deep & Deep Publications D-I 124, Rajouri Garden, New Delhi – 110027.
  14. P.S. Verma / V.K. Agrawal – Concept of Ecology, S. Chand & Lonpan Ltd. Ramnagar, New Delhi – 110055.
  15. Eug Warming – Ecology of Plants, Ambey Publications Delhi (India)
  16. Evgene P Odum – Ecology Oxford & IBH Publishing Co. Pvt. Ltd. Culcutta, New Delhi.
  17. Ishwar Prakash. Desert Ecology. Scientific Publications, Ratandas Road, Jodhpur. - 01 India.
  18. T.W. Woodhead. Plant Ecology. Sonali Publications.New Delhi.110002.
  19. Eug. Warming. Ecology of Plant. Ambey Publications Delhi.
  20. Jonathan Silvertown. Introduction To Population Plant Ecology. Longman Singapore Publisher, LTD.
-

---

**Paper- IV: Taxonomy of Angiosperms      (Lecture 30)**

---

|  |                   |
|--|-------------------|
| <b>Unit- 1: Introduction of Taxonomy</b>   | <b>(15 L)</b>     |
| 1.1- Introduction and definition.  | <b>(2 L)</b>      |
| 1.2- Aims and Principles of Taxonomy, methods of identification of plants.   | <b>(4 L)</b>      |
| 1.3- Primitive and advanced characters of the flower; concept of taxa (family, genus, and species).  | <b>(3 L)</b>      |
| 1.4- Types of classification: Artificial, Natural and Phylogenetic classifications.  | <b>(3 L)</b>      |
| 1.5- Outline of Bentham and Hookers system of classification; Salient features, merits and demerits of Bentham and Hookers system.                 | <b>(3 L)</b>      |
| <br><b>Unit- 2: Identification and Nomenclature</b>  | <br><b>(15 L)</b> |
| 2.1- Nomenclature; Binomial nomenclature of plants.  | <b>(2 L)</b>      |
| 2.2- ICBN- Introduction & Principles of ICBN.  | <b>(2 L)</b>      |
| 2.3- Herbarium and Botanical Garden Herbarium- Steps in preparation of herbarium specimens and significance of Herbaria.                           | <b>(3 L)</b>      |
| 2.4- Botanical gardens of India- Sir J. C. Bose Botanical Garden, Calcutta & Lead Botanical Garden of Shivaji University Kolhapur.                 | <b>(3 L)</b>      |
| 2.5- Study of Angiosperms families: Systematic position, Morphological & distinguishing characters with economic importance of following families: | <b>(5 L)</b>      |
| a) Caesalpiniaceae   | b) Solanaceae     |
| c) Amaranthaceae   | d) Liliaceae      |

---



• **References:**

1. Morphology of Angiosperms, J M Coulter and C J Chamberlain, Pointer Publishers, Jaipur.
  2. Taxonomy of Angiosperm R Pandey, S Chand and Co. Ltd, Ramnagar New Delhi.110055
  3. An Introduction to Taxonomy of Angiosperms- Pritish Shukla, Shital P Mishra, Vikas Publishing House, Pvt. Ltd. Gaziabad, UP.
  4. A Text Book of Angiosperms-B P Pandey, S Chand and Co Ltd. Ramnagar, New Delhi.110055
  5. A Text Book of Botany -‘Angiosperm Singh C Pande, D K Jain, Rastogi Publication, Shivaji Road Meerut.250002
  6. Taxonomy of Angiosperm, Neeru Mathur, Sonali Publications, New Delhi, 110002.
  7. Angiosperms-G L Chopra, Pradeep Publications, Jalandhar, 144008.
  8. Simpson, M.G. (2006). Plant Systematics. Elsevier Academic Press, San Diego, CA, U.S.A.
  9. Singh, G. (2012). Plant Systematics: Theory and Practice. Oxford & IBH Pvt. Ltd., New Delhi. 3rd edition.
  10. Jeffrey, C. (1982). An introduction to plant Taxonomy, Cambridge University Press, Cambridge.
  11. Judd, W.S., Campbell, C.S., Kellog, E.A., Steven, P.F. (2002). Plant Systematics-A Phyllogenetic approach. Sinauer Associates Inc., U.S.A. 2nd edition.
  12. 12.Maheshwari j.k. (1963). Flora of Delhi. CSIR, New Delhi.
  13. Simpson, M.G. (2006). Plant Systematics. Elsevier Academic Press, San Diego, CA, U.S.A.
  14. Singh, G. (2012). Plant Systematics: Theory and Practice. Oxford & IBH Pvt. Ltd., New Delhi. 3rd edition.
  15. Gaikwad, S. P. & Garad, K. U. (2015). Flora of Solapur District, Laxmi Book Publication Solapur.
-

• **List of Practical (based on paper no I to IV):**

1. Study of dissecting and compound microscope.
2. Electron micrographs/Models of viruses - T-Phage and TMV (photographs/models).
3. Gram staining (demonstration) and forms of Bacteria (permanent slides/photographs).
4. Identification of Algae, Fungi, Archegonites (Volvox, Gracillaria, Polysiphonia, Rhizopus, Penicilium, Agaricus, Marchantia, Adantium, Pinus,)
5. Study of Nostoc & Spirogyra.
6. Study of Sargassum & Vaucheria
7. Study of Mucor & Yeast.
8. Study of Albugo & Agaricus
9. Study of Riccia.
10. Study of Selaginella- Morphology of sporophyte and anatomy of stem, Strobilus.
11. Study of Cycas- Morphology of sporophyte and anatomy of leaflet.
12. Reproductive structure: male cone, microsporophyll, microspore and megasporophyll, L. S. of ovule (permanent slide).
- 13-14. Study of plant families:
  - i. Caesalpiniaceae & Solanaceae
  - ii. Amaranthaceae & Liliaceae
15. Study of soil PH by Universal indicator/pH paper/pH meter & Study of Water holding capacity of different soil.
16. Study of meteorological instruments (any three)
17. Determination of Density and Frequency of plants by quadrat method.
18. Ecological adaptations of Hydrophytes (Hydrilla, Eichhornia and Typha).
19. Ecological adaptations of Xerophytes (Nerium and Aloe).
20. Excursion report.

PUNYASHLOK AHILYADEVIL HOLKAR

SOLAPUR UNIVERSITY, SOLAPUR

Practicals of B.Sc. Part– I Botany (Semester System) (With effect from June 2022) Botanical Excursion: One teacher along with a batch not more than 20 students be taken for Botanical Excursion to places of Botanical interest, one in each term. If there are female students in a batch of twenty students, one additional lady teacher is permissible for excursion. T.A. and D.A. for teacher and non-teaching staff participating in excursions should be paid as per university rules. Tour report duly certified by teacher concerned and Head of the Department should be submitted at the time of practical examination. Practical Course: B.Sc. Part- I Botany practical course is to be covered in twenty practicals. These practicals are to be performed by the students. Each practical is to be supplemented by permanent slides, preserved/fresh specimens, materials, charts, herbarium sheets, meteorological instruments wherever necessary.

**Details of Practical Examination:**

- A) Every candidate must produce a certificate from Head of Department of his / her college, saying that he / she has completed practical course in satisfactory manner as per terms laid down by Academic council on the recommendations of Board of Studies in Botany. The student should record his / her observation and report of each experiment in the journal. The journal is to be signed periodically by teacher In charge and certified by the Head of Department at the end of year. Candidates must produce their certified journal and tour report at the time of practical examination. Candidate is not allowed to appear for the practical examination without a certified journal / loss certificate from Head of Botany Department regarding the same.
- B) Practical Examination should be of five hours duration and shall evaluate a candidate in the following respect. 1. Practical study of external and internal structures of different plant types and their classification. 2. Making temporary stained preparations and identification. 3. Identification and setting of biochemical experiments. 4. Study of plant families as per syllabus. 5. Spotting of the specimens as per syllabus.

Structure of the courses: -

- C) Each paper of every subject for Arts, Social Sciences & Commerce Faculty shall be of 50 marks as resolved by the respective faculties and Academic Council.
- D) For Science Faculty subjects each paper shall be of 100 marks and practical for every subject shall be of 100 Marks as resolved in the faculty and Academic Council.
- E) For courses which were in semester pattern will have their original distribution already of marks for each paper.

# Nature of Question Paper

## Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Nature of Question Paper for choice-based credit system (CBCS) Semester Pattern

Faculty of Science • (w. e. f. June 2022 for B.Sc.

I & From June 2023 for B.Sc. II)

---

**Time: -2hrs.**

**Total Marks- 40**

**Instructions:**

1. All questions are compulsory.
2. Draw **neat, labelled diagrams wherever** necessary.
3. Figures to the **right** indicate **full marks**.

---

**Q. No. 1) Multiple choice questions**

**(08)**

1.  
a)                      b)                      c)                      d)
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**Q. No. 2) Answer any four of the following**

**(08)**

- i.
- ii.
- iii.
- iv.
- v.
- vi.

**Q. No. 3) Write short notes on any two of the following**

**(08)**

- i.
- ii.
- iii.

**Q. No. 4) Answer any Two of the following**

**(08)**

- i.
- ii.
- iii.

**Q.No.5) Answer any one of the following**

**(08)**

- i.
  - ii.
-

Batch: \_\_\_\_\_

**PUNYASHLOK AHALYADEVJI HOLKAR**  
**SOLAPUR UNIVERSITY, SOLAPUR**

**B.Sc. Part- I: Practical Examination in Botany March/April 2023**

Centre: .....

Date: .....

Time: .....

Total Marks -80

---

**N. B.** 1. Draw neat and labeled diagrams wherever necessary.

2. Do not write about points of theoretical information unless asked specifically.

3. Perform the experiment as per instructions given by the examiners.

---

**Q. 1.** Identify and show the important structures observed by you in the given specimen- A, B and C leave your preparation for inspection. **24**

**Q. 2.** Determine Density/ Frequency of plant species of given quadrat. **08**

**Q. 3.** Set up the ecological experiment- D assigned to you and shows it to the examiner **08**

**OR**

**Q. 3.** Show the ecological adaptation in the given specimen- E. **08**

**Q. 4.** Assign the given specimen- 'F' to its respective plant family based on characters observed by you in it. Give important vegetative and floral characters. Draw floral diagram/ floral formula of it. **10**

**Q. 5.** Identifications **10**

1. Identify and describe the slide/ photograph- G (Viruses/ Gram staining/ Types of bacteria).

2. Identify and describe- H (Algae/ Fungi).

3. Identify and describe- I (Bryophyte/ Pteridophyte/ Gymnosperm).

4. Identify and describe- J (Vegetative character/ Reproductive character).

5. Identify and describe the specimen- K (Meteorological instrument).

**Q. 6.** a. Journal **10**

b. Excursion report. **10**

---